INSTITUTIONAL AND POLICY ANALYSIS OF RIVER BASIN MANAGEMENT

The Fraser River Basin, Canada[1]

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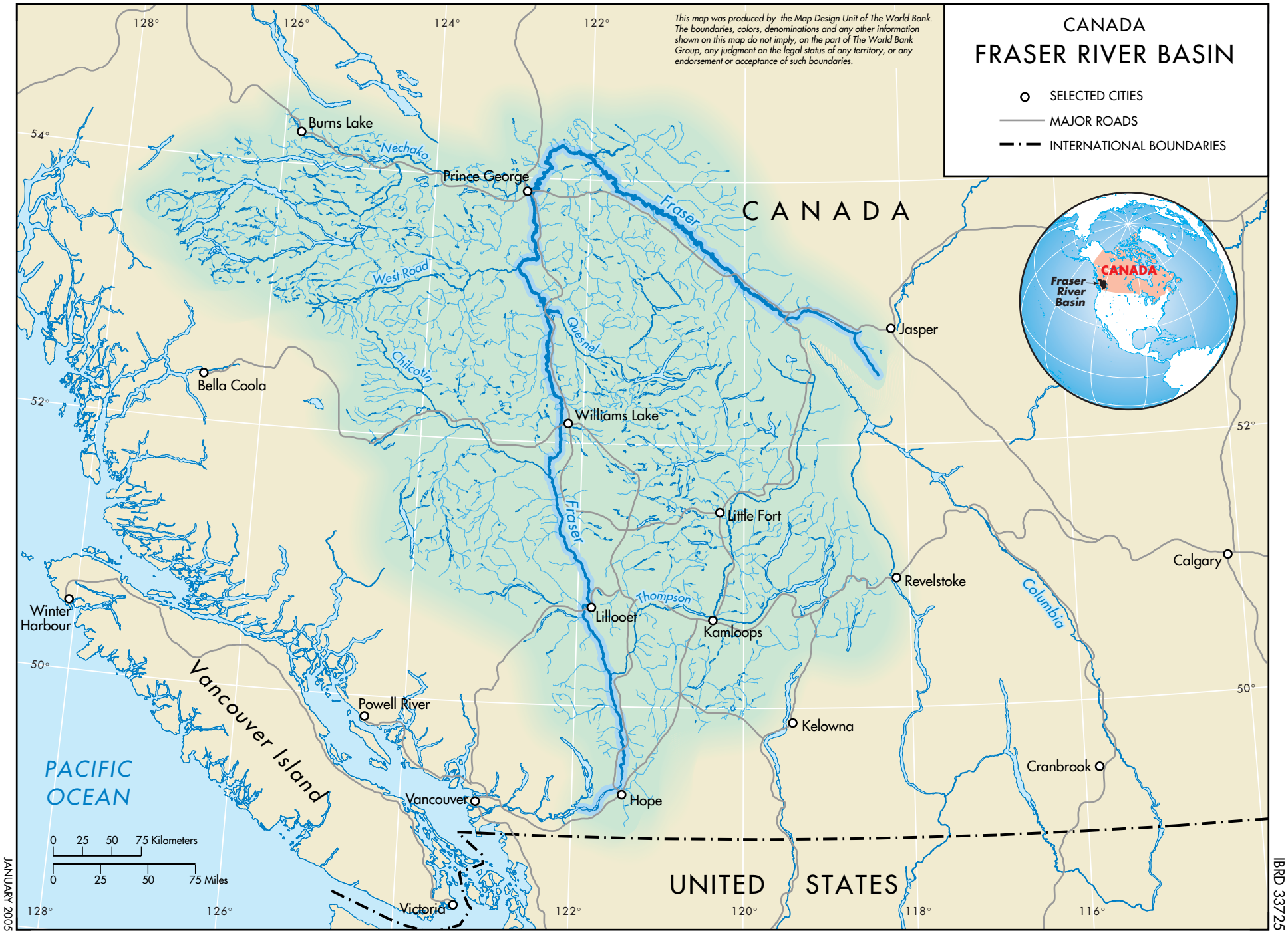
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CANADA
FRASER RIVER BASIN
SELECTED CITIES
MAJOR ROADS
INTERNATIONAL BOUNDARIES
CANADA
Fraser River Basin
Burns Lake
Nechako
Prince George
Fraser
West Road
Quesnel
Chilcotin
Jasper
Bella Coola
Williams Lake
Little Fort
Fraser
Calgary
Revelstoke
Columbia
Thompson
Lillooet
Kamloops
Winter Harbour
Vancouver Island
Powell River
Kelowna
Cranbrook
PACIFIC OCEAN
Vancouver
Hope
0 25 50 75 Kilometers
0 25 50 75 Miles
UNITED STATES
Victoria
128°
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JANUARY 2005
IBRD 33725

1. Background and Introduction

Integrated water resources management (IWRM) and organizing it primarily at the river basin level are two of the most common and widely repeated recommendations in the water resources literature of the last decade if not longer (Allee 1988; Galloway 1997; McDonald and Kay 1988; World Bank 1993). Basin management is often associated with the concept of decentralization, of managing water resources at the "lowest appropriate level." (See, e.g., International Conference on Water and the Environment 1992; Mody 2001). Several conceptual arguments have been presented in favor of decentralization in water resource management, and basin-level management in particular, including that the whole array of resources and use patterns in the basin will be taken into account, management decisions will be based on better knowledge of local conditions, and incentives for stakeholders to actively participate in management will be stronger.

Empirical studies of river basin management systems provide opportunities to examine the claims made for basin-level integrated resources management, and to explore factors that appear to influence its implementation and outcomes. In this research project the project team has searched for those factors and their relationships to river basin management in two ways: with a survey of river basin organizations throughout the world, and with case studies of eight river basins analyzed in greater detail. Some of those eight cases have long histories of basin-scale institutions for water resource management, such as the Guadalquivir river basin in Spain and the Murray-Darling river basin in Australia. Others have emerged recently, as in the Fraser basin in British Columbia, Canada where the Fraser Basin Management Board was established in the early 1990s, succeeded in 1997 by the Fraser Basin Council.

This case has been an extremely valuable addition to the research project, for three main reasons. First, it adds an example of a nongovernmental river basin organization, whereas the other cases were of governmental or inter-governmental structures. The Fraser Basin case is not one of governmental decentralization, but of the creation of a non-governmental body facilitating the coordination of a number of decentralized private-sector and public-sector activities within the river basin. Second, the Fraser Basin Council has pursued a very broad scope of topics that its members see as related to an overall concept of basin "sustainability," which includes social and economic as well as environmental aspects. Third, the formation of the basin council (and its predecessor basin management board) was a locally initiated action that occurred in the fairly recent memory of many individuals who are still actively involved, and whose perspectives on the origin and evolution of the basin management effort are both fresh and rich.

This paper focuses on analysis of the establishment of a non-governmental, multi-stakeholder, and consensus-based approach to river basin governance and management in the Fraser River basin. Only brief descriptions of the basin's physical characteristics, social and economic profile, and historical development are included in this paper; more detailed information about those important matters may be found in Calbick et al. (2004).

2. Analytical Framework

To analyze the data gathered for this project from the case studies and from the survey of river basin organizations, the project team has developed a framework that identifies a number of political and institutional factors which may be associated with the emergence, sustainability, and success or failure of decentralized approaches to integrated water resource management at the basin scale. These factors, and their hypothesized relationships with basin management in a country that has decentralized or is attempting to decentralize water resource management institutions, are derived from the institutional analysis literature relating to water or other natural resource management and to decentralized systems (especially Ostrom 1990, 1992; also Agrawal 2000; Alaerts 1999; Blomquist and Schlager 1999; Bromley 1999; Easter and Hearne 1993; Wunsch 1991).

Our information gathering and analysis focuses on the following sets of variables.

- Contextual factors and initial conditions
- Characteristics of the decentralization process
- Characteristics of central government/basin-level relationships and capacities
- The internal configuration of basin-level institutional arrangements
- Motivation of stakeholders

Variables considered within each set are listed the Appendix. The Fraser Basin case is discussed in terms of these categories and variables in Section 8.

3. Methodology

A case study approach was pursued for this project in order to examine closely the processes of institutional change as well as the current situation. A site visit was facilitated by Fraser Basin Council staff who arranged a schedule of interviews with basin stakeholders and observers, and by a local consultant engaged by the Fraser Basin Council who prepared a background paper on the basin prior to the visit. Background papers for all case study visits are based on a common outline. During the site visit, team members met with and interviewed 28 individuals, including basin-level stakeholders, past and current central, provincial and local government officials, basin council staff and members, and academic researchers with perspectives on governmental structure and water management in Canada.[2] The interviews were focused on understanding the processes of institutional origin and change, and the performance of water management institutions at sub-basin, basin, and national scales, matters that were closely within the

[2] These included individuals from the Canadian Department of Fisheries and Oceans, Environment Canada, the British Columbia Ministry of Sustainable Resources Management, the British Columbia Ministry of Health, the British Columbia Ministry of Water, Land and Air Protection, the Sto:lo First Nations tribal council, the Musqueam First Nations tribal council, B.C. Hydro, the Fraser River Port Authority, the Greater Vancouver Regional District, the Fraser River Estuary Management Program, the Burrard Inlet Estuary Action Program, the District of Kent, the Bulkley-Nechako Regional District, Gibraltar Mines Ltd., University of British Columbia, Simon Fraser University, Central Naturalists Council, Fraser Basin Council staff, and several individual proprietors doing business in the basin.

knowledge of the interviewees. After the visit, team members combined their notes from the interviews, revisited and revised the basin background paper, reviewed other materials, and composed this paper summarizing and analyzing the river basin management situation in the Fraser basin.[3]

The following analysis of the Fraser basin case is therefore based on a combination of sources—documentary materials on the basin and the various governmental and non-governmental organizations at work there, the background paper prepared for the visit, and the interviews conducted during the site visit. The findings and conclusions therefore do not represent the point of view of a single individual or organization, but emerge from a composite of data collected and reviewed by the research project team.

4. The Fraser River Basin[4]

The Fraser River drains 238,000 km^2 of British Columbia, an area about the size of the United Kingdom. The Fraser River basin supports a population of more than 2.7 million residents, and an economy that includes forestry and pulp and paper production, ranching and agriculture, fishing, mining, recreation and tourism and other industries. Seventy-eight percent of the basin's population lives in the lower Fraser River valley and estuary region where the Vancouver metropolitan area is located.

The basin has been home to aboriginal peoples, or First Nations, for thousands of years. The current population of indigenous residents is estimated to be 50,000. The number of distinct First Nations is subject to varying estimates, but Fraser Basin Council estimates place it around 100, which may be categorized into eight major language groups.

The river itself (named for explorer/settler Simon Fraser) is 1,399 km long, originating in the Rocky Mountains and emptying into the Strait of Georgia and the Pacific Ocean after flowing through the Vancouver metropolitan area. There are 13 principal watersheds or sub-basins of the Fraser basin, identified in Figure 1, but on a broader scale one could identify three main hydrologic regions—the coastal mountains, the interior plateau, and the eastern (Columbia and Rocky) mountains. The interior plateau is the driest of these regions, the coastal mountains the wettest.

Weather systems moving onshore from the Pacific deposit large volumes of precipitation during autumn and winter in the mountain ranges, increasing with elevation and occurring predominantly as snow that thaws through the spring and summer months. While snow also is the principal winter precipitation in the interior plateau, peak precipitation in this region occurs as spring and summer rainfall. In some areas of the basin, glacial melt is also an important source of surface stream flow.

[3] Comments on an earlier draft were received from Allen Domaas, Daryl Fields, and Hans Schreier and are appreciated.

[4] See map at the beginning of the paper.

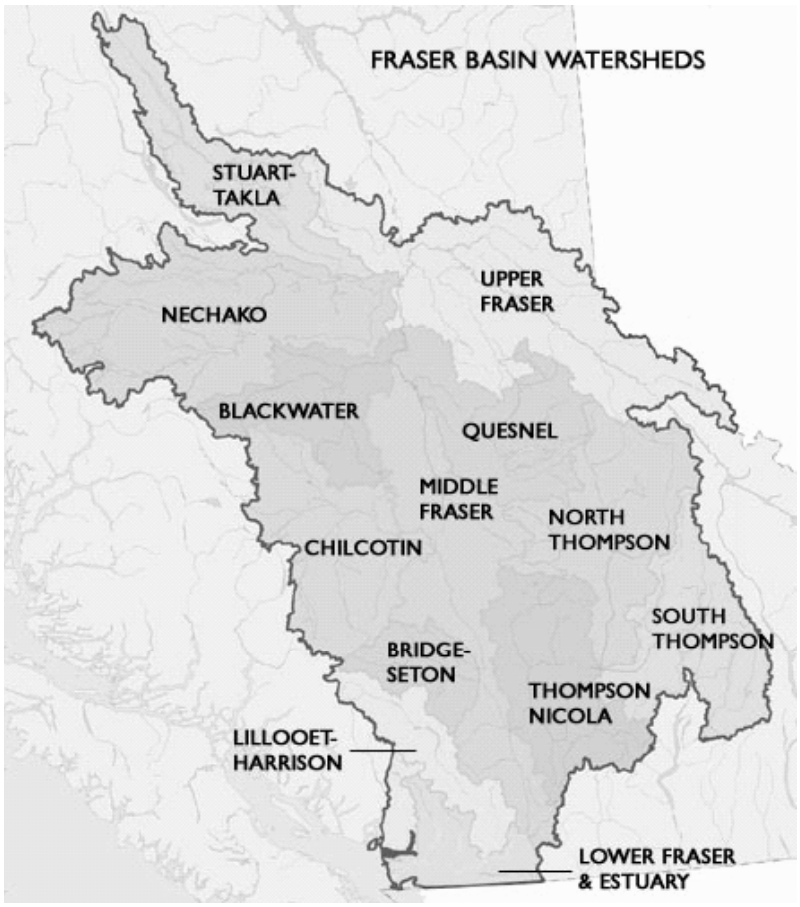

Figure 1. The Fraser River Sub-Basins.
Source: Fraser Basin Council, www.fraserbasin.bc.ca/fraser_basin/watersheds.html

Between snowmelt from the mountains and rainfall in the interior, spring and summer are the time of greatest stream flow in the Fraser basin. When spring or early summer rains coincide with peak periods of snow melt, flooding can be and has been a significant problem in the basin, especially in the lower Fraser sub-basin. The flood of record in the basin occurred in 1894, and the 20th century benchmark was a major flood in 1948. Even in non-flood periods, the amount of precipitation and stream flow concentrated in the lower Fraser River valley has contributed to drainage problems there. Millions of dollars of dyke works have been constructed and maintained, with financial assistance from the federal and provincial governments, to keep streams in the lower river area within their banks and to preserve agricultural lands and building foundations from seepage.

The interior portion of the basin is drier, and even subject to occasional drought. Non-aboriginal development of water use in the basin began with irrigation in the interior plateau in the mid-1800s. Farming and ranching in the interior, along with extractive industries such as timber and mining, sometimes compete for relatively scarce surface water supplies, particularly toward the late summer and autumn.

The river basin is also rich and diverse in natural resources. Eleven of the 14 biogeoclimatic zones of British Columbia occur in the basin, where an estimated 512

non-insect animal species live. The Fraser River has been a great salmon-producing system. More than half of Canadian catches of sockeye and pink salmon are from the Fraser River and its tributaries. For the many First Nations in the basin, fishing is important as both an economic and a cultural pursuit. Combining aboriginal and non-aboriginal commercial and recreational activities, fishing yields an annual return in excess of $300 million (Marshall 1998).

5. Basin Management Issues and Stakeholders

In addition to the flood hazard mentioned in the preceding section, the principal resource management challenges in the Fraser River basin are the following.

- Comparing the most recent decade with the historical record, the number of salmon returning to spawn have decreased in half of the basin streams assessed (FBC 2003) while increasing in others.
- Although toxic discharges have declined due to municipal sewage treatment plant improvements and the adoption of new technologies at pulp and paper plants in the basin, concentrations of toxic materials (e.g., chlorinated organic compounds such as guiacols from pulp mills) have accumulated in estuarine fish far downstream from discharge points.
- Eight of 15 streams designated by the British Columbia government as sensitive under the Fish Protection Act are in the Fraser basin.
- Toxic materials have also accumulated in the sediments and biota of poorly flushed streams and in areas adjacent to outfalls.
- Dyking and drainage in the lower basin area have reduced the extent of estuarine wetlands that are important to salmon and waterfowl populations.
- Precipitation is contaminated by heavy metals (e.g. lead, mercury) as well as PAH's and acidic gases, evidently from atmospheric emissions in the Greater Vancouver area.
- In the lower Fraser valley, groundwater has been contaminated by manure, fertilizers and pesticides—particularly the Abbotsford/Sumas aquifer and the Brookswood aquifer.
- Some lakes in the interior areas of the basin—particularly Williams, Loon, and Dragon lakes—are showing nutrient impacts from animal wastes.
- High water demands in drier portions of the interior have resulted in local water shortages.
- Approximately one of every ten vertebrate species in the basin is "red listed," meaning it is extirpated, threatened or endangered.
- Aging flood control infrastructure (especially dykes in the Fraser Valley) and exposure of the lower river basin to soil liquefaction in an earthquake, stimulating huge risks of additional losses from collapse of dykes.
- Nine aquifers in the Fraser basin are classified by the B.C. government as heavily used. Seventeen aquifers in the basin (11 in the Lower Fraser sub-basin and the other six in interior sub-basins) are classified as having substantial water quality or quantity problems. Intensive agriculture in the Fraser Valley has contributed more recently to concerns about groundwater contamination from fertilizer and pesticide applications.

- In the Fraser River estuary, conflicts over water use and wastewater disposal are most numerous and intense of those anywhere in the basin. The interests of commercial, recreational, and First Nations fishers collide with one another, as well as with river transportation and municipal and industrial waste discharges. Riverside access for shipping conflicts with desires of contemporary urban dwellers, governments, and developers for waterfront homes and restaurants, river walks, and green space. Effluent from three primary wastewater treatment plants in the region pollutes the water relied upon by fish for habitat, fishers for livelihood, and residents or tourists for recreation.
- Although fewer people live in the interior portions of the basin, their per capita water use is more than twice that of the lower valley. Also, the pulp mills found in the interior and upper basin use more water than any other industry in the basin. Thus, even in these portions of the basin where development is less extensive, water use can reach the capacity of water supplies in dry periods.
- On accessible lakes and streams in the upper basin, intensive recreational or sport fishing competes with aboriginal food and commercial fishing.
- In several portions of the basin, there are competing demands on dams and reservoirs to generate electrical power, reduce flood hazards, and maintain stream flows for fish habitat.
- The largest quantity of wastewater discharges is at the estuary. Three plants in the Greater Vancouver region release an estimated 429,000 cubic meters per day. Older systems combining stormwater and sewer tunnels result in combined sewer overflows that add millions of cubic meters per year of sewage to the river's main stem and north arm. A large number of lower-volume discharges to the Fraser River carry industrial wastes. (FREMP 1996; McGreer and Belzer 1999; Shaw and Tuominen 1999).
- Forest fire

This is an enumeration of issues, not a presentation of a policy agenda. Not all of these issues are within the jurisdiction of any single governmental entity, nor has the nongovernmental Fraser Basin Council embraced or addressed them all.

Although there are serious water resource management problems in the Fraser basin, there are also favorable situations not found in some of the other cases studied for this project. There remain undeveloped headwaters with pristine water quality. The main stem of the Fraser River has never been dammed, and will not be in the future due to its designation in Canadian policy as a Heritage River. The large size of the river basin, the large volume of flow on the main stem in normal years, and the fact that urban development has been concentrated mainly near the river mouth have reduced the negative impacts on the basin as a whole.

The principal groups of stakeholders affected by or trying to address the resource management issues in the Fraser basin are:

- B.C. Hydro—a Crown corporation[5] that provides hydroelectric power throughout the province of British Columbia, and which owns and operates facilities on tributaries in the basin.

[5] That is, a governmental corporation established by and for the province of British Columbia.

- First Nations—as mentioned earlier, there are dozens of First Nations communities in the basin, for whom the natural resources of the area have economic, subsistence, and historical-cultural significance.
- Port Authorities—The Fraser is a "working river," and its flow characteristics as well as the placement of in-channel and adjacent infrastructure (e.g., bridges, docks) are of vital significance to the managers of port authorities that attempt to promote and regulate river traffic.
- Mining—Part of the contemporary economy as well as the regional heritage of British Columbia (which had its own "gold rush" in the latter 1800s), metal and aggregate mines both consume and discharge water in the Fraser basin.
- Timber/forestry—Both in terms of land area and economic significance, forestry is one of the largest sectors in all of British Columbia and in the Fraser basin in particular. Timber harvesting is intertwined with several elements of the basin, from erosion concerns to the use of portions of the river for log shipment.
- Pulp and paper manufacturing—As would be expected in a region with such large timber operations, pulp and paper manufacturing is another large industry. Like mining, they both consume and discharge significant volumes of water and waste.
- Industry—Other manufacturing, particularly in the lower Fraser valley including the Greater Vancouver metropolitan area, relies upon water from the river basin and contributes wastes to it.
- Agriculture—As noted earlier, farming and ranching are significant operations in the interior, and the Fraser Valley is one of the most important food production regions in Canada.
- Commercial fishing—Salmon, sturgeon, and other valuable species are harvested from the Fraser and its tributaries and lakes, and support the livelihood of many basin residents and businesses. Deterioration of water quality and fish habitat, and competing claims of fishing rights from First Nations are substantial interests of the commercial fishers in the basin.
- Recreation and tourism—The rivers, lakes, estuary, mountains, and cities and towns of the Fraser basin provide a plethora of recreational opportunities for Canadian and non-Canadian visitors alike. Greater Vancouver is a very popular tourism destination (or point of origin, as for cruise ships), and the 2010 Olympic Winter Games will be centered in Whistler, a skiing and tourism center north of Vancouver. These industries are affected by, and affect, water quality and other environmental conditions within the basin.
- Environmental organizations—Nongovernmental organizations concerned with preservation of open space, protection of endangered species, improvement of river water quality and other issues are found throughout the basin. There is also an umbrella organization with which several organizations are affiliated—the British Columbia Environmental Network (BCEN).
- Federal agencies—As described a bit further below, agencies of the Canadian national government have responsibilities in the basin, requiring their attention and involvement in many or most basin-related projects or programs.
- Provincial agencies—Also noted below, the British Columbia government as a whole and several of its ministries have responsibilities in the Fraser basin, which is after all where the vast majority of British Columbians reside.

6. The Fraser Basin Council and Other Institutional Arrangements for Basin Management

Unique among the cases studied for this project, the Fraser River basin has a pair of non-governmental organizations as its principal governance and management institutions—the Fraser Basin Council Society and the Fraser Basin Council. The society is a non-profit, charitable organization governed by a board of directors and able to receive funding from public and private sources. Its principal function is to provide a legal foundation for the Fraser Basin Council. In this capacity, the society acts as custodian of the council's constitution and bylaws. Members of the society are empowered to elect the officers of the society (i.e., president, vice-president, and secretary-treasurer) who, in turn, become the officers of the council (chair, vice-chair, and executive director).

The Fraser Basin Council is a multi-organizational, multi-interest planning body composed of 36 representatives drawn from diverse geographical and sectoral communities within the basin, as well as from what are called in Canada the four orders of government—federal, provincial, local/regional, and First Nations. Although the Fraser Basin Council Society is essential to the existence and funding of the Fraser Basin Council and its activities, the council is actually the body that addresses, discusses, and decides upon basin planning and management priorities and activities. The Fraser Basin Council will therefore receive more attention in the remainder of this paper than the society.

The society and council themselves are of fairly recent origin, dating from 1997. They have emerged, though, from a process that can be dated to a sequence of events in the 1970s, 1980s, and early 1990s, and they are the outgrowth of a predecessor organization, the Fraser Basin Management Board, which existed from 1992 through 1997. To understand the reasons for the Fraser Basin Council's existence, composition, and operation, it is important to understand the intergovernmental context of the Fraser River basin, and two processes that preceded the creation of the society and council—the Fraser River Estuary Management Program (FREMP) and the Fraser Basin Management Program (FBMP).

6.1 The Intergovernmental Context

Canada's federal system gives provincial legislatures power over natural resources, including inland waterways and lakes. Thus, most major water uses in the Fraser River basin operate under permits or licenses issued by British Columbia authorities, operating primarily from the provincial capital in Victoria.

However, both the national Parliament and the provincial legislatures have power over agriculture, with national law prevailing if it conflicts with provincial law. Furthermore, Parliament has exclusive power over regulation of interprovincial and international trade; navigation and shipping; the fisheries; and First Nations. Federal jurisdiction applies to the conservation and protection of oceans, fisheries, navigation, and international relations (including boundary waters with the U.S.), and to water on federal lands, in national parks, and in First Nations' communities. Moreover, the national government can offer the provinces and territories funding to administer programs and services in accord with national standards.

Therefore it is not possible to say simply that natural resources (particularly water) are a provincial matter in the Canada, in light of the federal government's roles in agriculture, navigation, fisheries, and First Nations affairs, and its ability to offer funding to provinces for following federal guidelines in other matters. As one interviewee characterized both the prospects for confusion and the need for intergovernmental coordination, the fish in the water are federal fish and the boats in the water are federal boats but the water is provincial water.

The distribution of authority and responsibility between the provincial and federal governments is compounded by the horizontal distribution of water-related responsibilities within each government. Environment Canada (EC) and the Department of Fisheries and Oceans (DFO) are the principal federal agencies involved in water resources management. EC compiles water quality and quantity data and sets water quality guidelines. DFO is involved in management and protection of anadromous fish stocks and their habitats, and operates or promotes stock enhancement plans and habitat protection programs. Other federal agencies with responsibilities that often affect water resources are the Department of Canadian Heritage, which coordinates the federal-provincial Heritage Rivers program (the Fraser is one), and Infrastructure Canada which provides matching funds for investment in projects that may include municipal water and wastewater treatment plants.

Three provincial ministries in British Columbia have significant roles in the planning, management, and protection of water resources, environmental quality, and public health. The Ministry of Water, Land and Air Protection (MWLAP) regulates and protects water quality and quantity through monitoring and source water protection efforts. The Ministry of Sustainable Resource Management is the lead agency at the provincial level for planning, policy development, and information provision regarding the sustainable economic development of Crown land and water resources,[6] and undertakes strategic planning regarding the long-term management and protection of natural resources in the province. The Ministry of Health Services regulates drinking water quality delivered to the public (although MWLAP has responsibility for protecting drinking water sources).

Provincial government in British Columbia also delegates vital responsibilities to local governments (primarily municipalities and regional districts) for drinking water treatment and distribution, and wastewater collection, treatment, and disposal. In British Columbia, local governments that are potentially relevant to water resources include incorporated municipalities (cities, districts, towns, and villages), regional districts, and special purpose improvement districts. Local government revenues are derived primarily from property taxes and intergovernmental grants from the provincial government.

Overall, water resource management in British Columbia involves all orders of government—federal, provincial, local, and First Nations—and involves many agencies and organizations (Table 1). There are by one count 13 government agencies involved in some aspect of drinking water management in British Columbia, with cross-agency meetings convened from time to time by personnel at the Ministry of Health Services.

[6] The vast majority of land and natural resources (including water) in British Columbia is owned by the government, and available for private development and use under terms of rental or lease.

Table 1. Principal agencies and functions in the Fraser Basin

Order (level) of government	Principal agencies	Primary purposes	Formal authority
Federal (Canada)	Environment Canada	Regulates and monitors water quality	Environmental Protection Act
	Department of Fisheries and Oceans	Manages anadromous fish stocks and habitat	Fisheries Act
	Infrastructure Canada	Matching funds for water/ wastewater treatment plants	Numerous
	Department of Canadian Heritage	Administers the Heritage River system	Canadian Heritage Act
Provincial (British Columbia)	Ministry of Water, Land and Air Protection (MWLAP)	Regulates water resource quality and quantity	Waste Management Act
	River Forecasting Centre (now part of MWLAP)	Forecasts water quantity conditions	
	Ministry of Sustainable Resource Management	Develops water resources, provides guidance and leadership on water policy and planning	Numerous
	Land and Water B.C., Inc.	Manages surface water allocation by issuing licenses	Water Act
	Ministry of Health Services	Regulates drinking water quality	Drinking Water Protection Act
	B.C. Hydro	Hydropower generation	Hydro and Power Authority Act
Local (numerous)	Municipalities, regional districts, improvement districts	Water treatment and distribution; wastewater collection, treatment, disposal services	Local Government Act
First Nations (numerous)	Indian and Northern Affairs Canada	Administers potable water supplies on reserves	Indian Act

Source: Calbick et al. 2004

The distribution of resource management responsibilities across agencies and orders of government in the Fraser River basin has not prevented governments and their personnel from working together on important initiatives and sustaining them over time. One example is the Canada-British Columbia Water Quality Monitoring Agreement, established in 1985 and still in effect. Under this agreement, government personnel have performed bi-weekly sampling and reporting of results on the presence of ions, nutrients, trace metals and an indicator of industrial discharges from a number of locations in the basin. Water quality monitoring on the main stem of the Fraser River at Hope has

occurred every two weeks since 1979, with other water quality indicators added to the testing protocol in 1987 and 1991. The same monitoring has occurred on the river at Marguerite and Hansard since 1985, and at Stoner since 1990, and on the Thompson and Nechako rivers since 1985. B.C. government has also participated extensively in federal-provincial irrigation and drainage and flood-control programs, and has provided funding for additional flood protection projects on its own.

Intergovernmental cooperation in natural resource management activities is certainly not out of the question, but even when it works well it entails high coordination costs. Furthermore, the cooperation of government agency personnel does not necessarily bring other basin stakeholders into a process of information development and sharing, communication, and decision making. An important example in a portion of the Fraser River Basin, the Fraser River Estuary Management Program, demonstrated the benefits and the drawbacks of the inter-agency partnership approach.

6.2 The Fraser River Estuary Management Program

Detailed in Calbick et al. (2004: 51-54), the Fraser River Estuary Management Program emerged from a study initiated in 1977, proceeded through some organizational modifications in the mid-1980s (see Table 2), and still operates today. Noted observer and scholar Anthony Dorcey has characterized it as the most successful coastal zone management program in Canada (Dorcey 1990).

Table 2. Chronology of Institutional Development in the Fraser Basin

Year	Fraser estuary programs and organizations	Fraser Basin programs and organizations	Related events
1977	Fraser River Estuary Study, guided by federal-provincial steering committee (1977-80) and Fraser River Estuary Planning Committee (1980-84)		
1978			
1979			
1980			
1981			
1982			
1983			
1984			
1985	Fraser River Estuary Management Program (FREMP)		
1986			
1987			
1988			
1989			
1990		Fraser Cities Coalition formed, which establishes the Fraser Basin Start-Up Committee	Vancouver and Prince George mayors challenge each other to clean up the Fraser.

1991		Fraser River Action Plan (FRAP)	Fraser River Management Program (FRMP), and Fraser River Management Board (FRMB)	Federal "Green Plan" provides funding source for FRAP.
1992				
1993				FBMB adopts Strategic Plan
1994				
1995				First "State of the Basin" report
1996				
1997				Charter for Sustainability approved
1998			Fraser Basin Council (FBC)	
1999				
2000				First "State of the Basin" conference
2001				
2002				
2003				First "Snapshot on Sustainability" indicators report
2004				

The Fraser River estuary is by far the most populated and developed freshwater-ocean interface on the Pacific coast of Canada. As the Fraser River approaches the Pacific, the river diverges into three "arms" which flow through the Greater Vancouver metropolis and empty into the Strait of Georgia between the mainland and Vancouver Island. Port facilities, river traffic, salmon and sturgeon fisheries, urban wastewater and stormwater disposal, and a host of other interest and uses converge in this estuarine region. Concerns about the degradation of water quality in the estuary, protection of fish habitat and the livelihoods of fishers, and preservation or even expansion of river transportation as an essential element of the regional economy rose in the 1970s along with governmental policy interest in coastal zone management and comprehensive basin planning.

Thus began the Fraser River Estuary Study in 1977 under a federal-provincial agreement, guided by a federal-provincial steering committee. After an initial three-year phase, the scope of the study and the composition of the steering committee were broadened. The steering committee became the Fraser River Estuary Planning Committee, which later published a report outlining a number of options and actions to be taken for improving estuary conditions and accommodating the multiple and sometimes conflicting uses therein. This report was revised and adopted by the federal and provincial governments and two port authorities in 1985 as the Fraser River Estuary Management Program (FREMP). FREMP operates with a five-agency executive, consisting of representatives from each of the two federal agencies, two port authorities, and the provincial ministry that signed the agreement establishing the program. Those

five plus 27 at-large members constitute the FREMP Management Committee; the at-large members represent other provincial and federal governmental agencies, local governments and regional districts, and several First Nations. Thus FREMP's structure involves considerable representation of governmental personnel. Through FREMP, coordinated review of permit applications within the estuary has been improved among governments, and detailed management plans have been developed and agreed for major environmental subsystems within the estuary.

6.3 The Fraser Basin Management Program, and the Fraser Basin Management Board

FREMP has been a success, but it involved intensive and sustained collaboration among multiple federal, provincial, and local governments. It has been criticized, furthermore, for lacking a formal place for non-governmental organizations. When efforts began to focus on developing a plan for improving the conditions of the entire Fraser River—in 1990-91 with the creation of the Fraser Basin Start-Up Committee, the Fraser Basin Action Plan, and the Fraser Basin Management Program—what emerged was the idea of a basin management board responsible for planning and executing projects, with input and funding from governmental agencies and with participation by First Nations and nongovernmental bodies. On May 26, 1992, an agreement was reached among the principal federal agencies, DFO and EC, and the provincial government to initiate a five-year Fraser Basin Management Program (FBMP) and to have it led by the Fraser Basin Management Board (FBMB). The FBMB was intended to be a multi-organizational, multi-interest committee with the purpose of encouraging consensus-based decision making about basin activities and with a commitment to employing consensus decision making itself.

The FBMB was the first basin-scale organization in the Fraser basin. The board was composed of 19 members, with three representatives from each of the four orders of government in the Canadian political system (federal, provincial, local or regional, and First Nations) comprising 12 of the members, six more coming from non-governmental organizations representing economic, environmental, and social interests in the basin, and one appointed "neutral" chair (i.e., whose participation could not add to that of an organization or government agency already represented on the board). Difficulties were encountered and adjustments were made during the FBMB's first year in determining some of the six NGO and three First Nations representatives. A good deal of effort during the FBMB's early meetings was consumed by processes of communication and education, as board members of differing expertise and background, differing levels of familiarity with governmental processes, and differing locations within the basin had to learn how to understand one another and make themselves understood, and how to think about the basin as a whole rather than solely about their portion of it or their interest in it. They also had to reconcile their differing views of the board's mission and scope of authority (Calbick et al. 2004: 59-60), since there was no predecessor organization on a basin scale from which the FBMB could evolve and adapt.

The FBMB in 1993 adopted a Strategic Plan, centered upon a set of principles to guide the implementation of the Fraser Basin Management Program. These included meeting the needs of all people in the basin within the ecological constraints of the basin

itself; incorporating aboriginal interest and concerns; assuring the conservation and prudent management of renewable and nonrenewable resources; fostering equal and fair access to information and decision making processes; coordinating data collection, sharing, and analysis for the sake of encouraging integrated and innovative approaches to basin planning; and recognizing the need for adaptive and precautionary decision making. The FBMB established five goals for the FBMP, linked with five strategic programs and action plans, toward the end of adopting a "Strategy for Sustainability" by 1997, the end of the five-year agreement that had established the FBMP and FBMB.

Learning to apply and abide by consensus decision making was one of the board's challenges through its five years. The board adopted a method of relying upon task forces and committees established for each major topic or initiative, and then reflecting the diversity of interests on the whole board in the membership of those sub-units. These multi-interest committees provided more opportunities for interpersonal information sharing and trust building, as well as providing some assurance for the board as a whole that when an initiative came to the board from a committee or task force it had already received some attention and input from most of the interests represented on the board.

The FBMB employed a professional staff and leased its own office space, rather than relying on the participating governmental agencies to provide these services. It was, and is, an important measure of the support of the participating governments that they have made and sustained the financial commitments to make this possible. The important functions performed by the FBMB staff—organizing meetings, researching basin issues, circulating minutes and memoranda among board members, developing reports and newsletters for media and public information—might have been assigned to staff from participating agencies instead, but they would have had to balance those tasks along with their other roles and responsibilities. The FBMB staff was able to focus full-time on these matters instead. This distinguished the FBMP effort from more traditional inter-governmental or inter-agency partnerships, contributed to the confidence of participants in the transparency of information generation and sharing, and fostered perceptions of independence and legitimacy for the FBMP that reinforced the commitments of NGO and First Nations representatives.

A staffing decision of equal or even greater significance was taken in 1995, to hire regional coordinators and place them in four regions of the basin. These regional coordinators gave the FBMP and FBMB a continuing presence in the main regions of the basin, rather than having all staff concentrated in Vancouver. In light of the size of the Fraser River basin, the decision to employ regional coordinators had both symbolic and pragmatic significance: it communicated a tangible message to distant portions of the basin that they were important and that the FBMP wasn't merely a set of activities to be run from Vancouver, and it gave individuals and organizations someone closer at hand to contact with questions, ideas, and requests for information. The Fraser Basin Council has continued the practice of employing regional coordinators. Participants interviewed for this project reported having good relationships with the coordinators for their respective regions, and indicated that the presence of the regional coordinators reinforced their own commitment to the basin planning and management efforts.

Another important practice initiated by FBMB and continued under the Fraser Basin Council has been the development of a set of "sustainability indicators" and the publication of a "State of the Basin" report. The first report was published in 1995 and

contained sections on eight key issues in the basin. It was accompanied by a briefer "Report Card," grading progress in the basin on some of the more critical issues (Calbick et al. 2004: 66). Updated reports and report cards have been issued since, culminating with the publication of a "Snapshot on Sustainability: State of the Fraser Basin" report in 2003.

The greatest significance of this effort is the explicit incorporation of assessment methods and progress reporting into the basin governance and management structure, with the development of data that can be monitored over time to document changes in basin conditions. Fraser Basin Council staff interviewed for this project likened the sustainability indicators and the state of the basin reports to "vital signs" being used to "monitor the basin's health." Data concerning the sustainability indicators can be used to establish priorities for attention and action in basin regions or for the basin as a whole.

6.4 The Charter for Sustainability and the Fraser Basin Council

As the five-year Fraser Basin Management Program neared its end in 1997, the participants on the FBMB drew together a kind of constitutional document for the Fraser River basin, which is titled the Charter for Sustainability and was published by the FBMB successor Fraser Basin Council (Fraser Basin Council 1997). The most striking aspect of the charter is the tremendous breadth that is given to the concept of basin sustainability, which extends far beyond the water resource focus common to the other cases studied for this project. A sense of this breadth is conveyed by the document's vision statement, four directions, and twelve principles, shown in Table 3.

Table 3. The Fraser Basin Sustainability Concept

Vision: The Fraser basin is a place where social well-being is supported by a vibrant economy and sustained by a healthy environment.	
Four Directions	
Understanding Sustainability	Governments, community groups and individuals recognize why and how they can contribute to building vibrant communities, developing strong and diverse economies, and maintaining the air, water, land and living species that make up ecosystems.
Caring for Ecosystems	Individuals are all stewards of resources such as water, forests, fish, wildlife and land. Individuals, as stewards, conserve and enhance ecosystems to maintain strong and diverse economies and to support growing communities. In this way, people not only enjoy a natural environment, but also conserve it to support a high quality of life.
Strengthening Communities	Communities benefit from local experience, skills and values. Strong communities are built on a diverse economy, an educated workplace, safe neighborhoods, accessibility to basic commodities, shared goals, local action and a sense of belonging.
Improving Decision Making	Decision making is shared and people work together to reach creative agreements and achieve common goals. These reflect the interests of a growing population mixed in gender, culture, religion, age and

	interest; and where aboriginal rights now being defined are reconciled in a just and fair manner.
Twelve Principles	
Mutual Dependence	Land, water, air and all living organisms including humans, are integral parts of the ecosystem. Biodiversity must be conserved.
Accountability	All residents are responsible for the social, economic and environmental consequences of their decisions and accountable for their actions.
Equity	All communities and regions must have equal opportunities to provide for the social, economic and environmental needs of residents.
Integration	Consideration of social, economic and environmental costs and benefits must be an integral part of all decision making.
Adaptive Approaches	Plans and activities must be adaptable and able to respond to external pressures and changing social values.
Coordinated and Cooperative Efforts	Coordinated and cooperative efforts are needed among all government and non-government interests.
Open and Informed Decision Making	Open decision making depends on the best available information.
Exercising Caution	Caution must be exercised when shaping decisions to avoid making irreversible mistakes.
Managing Uncertainty	A lack of certainty should not prevent decisive actions for sustainability.
Recognition	There must be recognition of existing rights, agreements and obligations in all decision making.
Aboriginal Rights and Title	We recognize that aboriginal nations within the Fraser basin assert aboriginal rights and title. These rights and title now being defined must be acknowledged and reconciled in a just and fair manner.
Transition Takes Time	Sustainability is a journey that requires constant feedback, learning and adjustment. In the short term, the elements of sustainability may not always be in balance.

Source: Fraser Basin Council 1997

The breadth of the basin sustainability concept is further illustrated by the following list of basin-wide and regional concerns that have been the subject of Fraser Basin Council programs or have been topics for discussion on the agenda of the council or one or more of its committees:

- Maintaining a healthy estuary at the mouth of the Fraser River
- Managing waterborne debris in the lower basin
- Removal of gravel accumulation in the lower Fraser River
- Cleaning up pollution from the Britannia Mine (which is not located in the Fraser Basin but the clean-up effort was led by the Basin Council)
- Flood preparation

- Flood hazard reduction
- Erosion
- Deteriorating water quality in some lakes and streams
- Maintaining healthy fisheries and fish habitat
- Habitat loss
- Growth management
- Increasing population in the lower basin
- Urbanization and urban sprawl in the lower basin
- Transportation congestion in the lower basin
- Air pollution in the lower basin
- Loss of agricultural land
- Invasive species
- Forest devastation from Mountain Pine Beetle epidemic and increased risk of forest fires
- Conflicts over land use, especially at the urban/rural interface
- Dependence of many communities on single industries; need for economic diversification
- Access to health care
- Effective transportation links in the upper areas of the basin
- Population and economic losses in rural communities, especially in the Cariboo-Chilcotin region
- Improving aboriginal/non-aboriginal relations
- Ensuring that the 2010 Olympic Winter Games are sustainable
- Dealing effectively with crime and other social problems

As the list indicates, the Fraser Basin Council has embraced a conception of "the basin" that involves much more than usual ideas of river basin management, and a conception of sustainability that has social and economic elements as well as environmental ones. The breadth of the council's interests and activities results from the combined effects of its membership composition, the size and diversity of the basin itself, and the institutional imperative of the council's need to sustain itself financially by getting involved in a number of projects for which funding is available.

Among the principal goals of the Fraser Basin Council has been to promote a perspective of interdependency and relationship among residents and communities throughout this very large basin. The FBC staff cite examples such as these, which are also found in Calbick et al. (2004):

- Upstream pulp mills contaminate fish hundreds of kilometers downstream in the estuary.
- Diversion of water from headwater streams reduces flows in the Fraser River mainstem, increasing the concentration of pollutants and contributing to low-flow conditions that threaten fish migration.
- Fishing in the coastal and estuarine portions of the river basin intercepts migratory fish and reduces up-river catch.
- Air pollution from the Greater Vancouver area blows eastward and contaminates the inland reaches of the Fraser Valley.

- Over-fishing in the lower portions of the river basin shifts fishing activity upstream.
- Declining stocks of mature timber in the lower sub-basins shift demands to the upper sub-basins.
- Loss of forest cover in the upper sub-basins aggravates erosion and flood hazards downstream.

The breadth of the Fraser Basin Council's agenda is reflected in, and reflects, some of its organizational characteristics. As noted earlier, the council is composed of 36 members, an expansion from the predecessor FBMB. Furthermore, Fraser Basin Council seats are deliberately distributed so that no sector of basin interests or level of government has a majority of members and so non-water as well as water-related basin interests are represented. Table 4 provides the breakdown of Fraser Basin Council representation.

Table 4. Composition of Fraser Basin Council members

Number of members	Category of representation or interest
3	Federal government agencies, typically one from DFO, one from EC and one from the 10 other relevant departments.
3	Provincial government agencies, typically one from Ministry of Sustainable Resource Management, one from Ministry of Water, Land and Air Protection, and one from Land and Water B.C. or Ministry of Health Services
8	Regional districts—these are local government units larger than the scale of a municipality but below the province level. The Fraser basin encompasses eight regional districts. Regional district representatives may be from regional district governments or from municipalities or other local government units within a regional district
8	First Nations representatives—one from each of the eight language groups in the basin, chosen by the tribal councils of the First Nations associated with that language group
10	Regional representatives—two non-government individuals from each of the five regions of the Fraser Basin designated by the Fraser Basin Council
1	Basin-wide representative with a perspective on economic sustainability
1	Basin-wide representative with a perspective on social sustainability
1	Basin-wide representative with a perspective on environmental sustainability
1	Impartial chair who serves as president of the council
36	Total

Source: Calbick et al. 2004

The membership structure conveys the diversity of represented interests fairly well, but not entirely. Several members wear "multiple hats," representing for instance not only a geographic region in the basin but also an interest sector (e.g., a regional

representative who is also a rancher, or one who is employed by a mining company, or who works in forestry, etc.) Thus, depending on the particular group of individuals serving on the council at a time, the 36 seats place even more than 36 interests at the table for council meetings.

The presence of eight First Nations' representatives on the council makes it a unique organization, in British Columbia, in Canada, and perhaps internationally. The sustained effort to incorporate aboriginal along with non-aboriginal interests on the council, and in more than a merely token fashion, was mentioned by several interviewees as not only a distinctive feature of the council but a very positive one.

The Fraser Basin Council has continued the FBMB practice of maintaining consensus-based decision making. Each policy recommendation or programmatic involvement of the council has to be acceptable to all members; otherwise, the matter is continued for further discussion and refinement, or dropped.

As noted earlier, the Fraser Basin Council had maintained the earlier FBMB practice of employing regional coordinators in addition to the staff in Vancouver. The council has divided the Fraser basin into five regions, shown in Figure 2, based primarily on sub-basin groupings but also reflecting some jurisdictional boundaries (particularly regional districts). These are the basis not only for the assignment of regional coordinators but for the designation of regional representatives on the council noted in Table 4.

- The Greater Vancouver-Squamish-Pemberton region, which includes the Lower Fraser sub-basin and the Greater Vancouver and Squamish-Lillooet Regional Districts;
- The Fraser Valley region, which includes the Lillooet Sub-basin and the Fraser Valley Regional District;
- The Thompson region, which includes the North Thompson, South Thompson, Thompson/Nicola, and Bridge-Seton sub-basins, and the Thompson-Nicola and Columbia-Shuswap Regional Districts;
- The Cariboo-Chilcotin region, which includes the Quesnel, West Road/Blackwater, Chilcotin, and Middle Fraser sub-basins, and the Cariboo Regional District; and
- The Upper Fraser region, which includes the Upper Fraser, Nechako, and Stuart-Takla sub-basins and the Fraser-Fort George and Bulkley-Nechako Regional Districts.

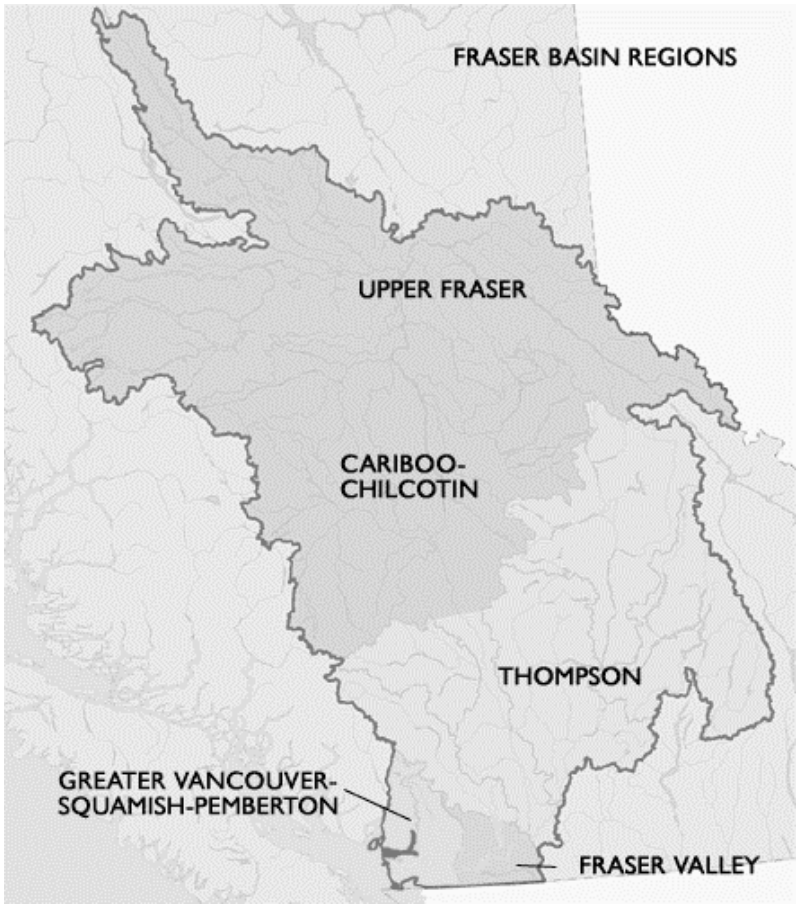

Figure 2. Fraser Basin Council Designated Regions of the Fraser River Basin
Source: Fraser Basin Council, www.fraserbasin.bc.ca/regions/index.html

The breadth of the Fraser Basin Council's conception of basin sustainability is also reflected in its programs and its finances. A sampling of Fraser Basin Council activities is listed here—for a fuller list and brief descriptions, see Calbick et al. (2004: 71-81)

Basin-wide programs

- Flood Hazard Management
- Strengthening Communities
- Invasive Plant Strategy for British Columbia
- Sustainable Fisheries Strategy
- First Nations Action Plan

Regional programs

- Britannia Mine Reclamation and Remediation
- Greater Vancouver Regional District Sustainable Region Initiative
- Agricultural Nutrient Management
- Shuswap Lake Water Quality
- Caribou Management
- Chilako Watershed Council

- Nechako River Environmental Enhancement

Apart from the facts that this is a partial list and that the Fraser Basin Council is in only its seventh year of existence, this diverse agenda of programs also aids in understanding an important point about the Fraser Basin Council's finances. Unlike its predecessor organization, the FBMB, the Fraser Basin Council has moved beyond total reliance on funding support from government agencies and added "project funding," i.e. funding that comes from public and private organizations that contract with the Fraser Basin Council to perform a study, organize an event or program, administer a project, etc. The Fraser Basin Council still relies on core funding support from federal, provincial, and local government annual contributions, but that funding has declined from 95% of the council's revenue in 1998 to 51% of its revenue in 2003, while project funding has grown from 4% of council revenue in 1998 to 36% in 2003. (It is important to note that the budget contributions from federal, provincial, and local governments have not declined in amount, just proportion; the Fraser Basin Council's revenue has roughly doubled since 1998, and project revenue accounts for the vast majority of the increase.)

In addition to programs such as those listed above and in Calbick et al. (2004), the Fraser Basin Council has continued and expanded the public information and outreach programs started by the FBMB in the mid-1990s. The Fraser Basin Council published another State of the Basin report in 2000, along with a shorter "Snapshot on Sustainability" in 2003, followed by an update in 2004. In conjunction with these reports, the council staff continue to refine and expand the list of "sustainability indicators" begun in 1995, based on feedback from readers of the reports as well as the availability or development of new data sources. The council also publishes an annual report of its activities, organization, and finances. Over the last five years, the council has added a new dimension to its public reporting and outreach with State of the Fraser Basin Conferences. These biennial conferences, begun in 1998, bring individuals and organizations throughout the basin together not only for a day of information sharing about basin conditions but also for discussion of issues of basin-wide significance and impact.

7. Participants' Motivations, Incentives, and Actions

A non-governmental organization responsible for basin planning and monitoring, inter-organizational coordination, and public information, which has managed to double its annual revenues since 1998 and extend its involvement to more than a dozen basinwide and sub-basin programs raises important questions about why and how participants have created and sustained it. The questions are even relevant to the five-year period of the FBMB prior to the establishment of the Fraser Basin Council.

As Calbick et al. (2004: 61) point out, federal and provincial agencies and their representatives viewed the FBMB as an instrument—a way of achieving the inter-organizational coordination they knew they needed in order to achieve basin management priorities. Local government representatives viewed the FBMB and its programs as a means of securing priority funding for important local and regional projects from federal and provincial authorities. First Nations representatives viewed it as one of the first open recognitions of their status as one of the four orders of government, and as a forum for airing their concerns in the basin (primarily regarding fishery allocations). Non-

governmental organizations who participated in its advisory bodies viewed it as a means of influencing governmental policy decisions.

Based on the interviews conducted for this project, the creation of the Fraser Basin Council with a broader representation and agenda has underscored those motivations and added others. Federal agencies have been willing to fund, send representatives to and cooperate in programs with the Fraser Basin Council because it allows them to influence resource management issues that might otherwise be beyond their constitutional authority, and because the council is an organization to which the federal agencies can hand off problems and concerns for investigation and discussion. The council also allows the agencies to satisfy statutory and regulatory obligations for public participation in basin management programs.

Provincial ministries and their representatives find in the Fraser Basin Council a means to break out of the substantial inter-agency fragmentation of water resources responsibilities at the provincial level, overcome budgetary limitations on their resources, engage greater participation, and have an organization to which they can hand off problems for investigation and discussion. As with the federal agencies and their representatives, these benefits of council participation suffice for provincial ministries to maintain their annual financial support of the council.

With its breadth of representation and its consensus-based approach to decision making, the Fraser Basin Council provides valued political cover and leverage for federal and provincial agency personnel. An issue that has been investigated and discussed by the basin council, and on which the council has arrived at a consensus recommendation for actions to be taken, is in much stronger position to be implemented by federal and provincial agencies.

Furthermore, the council's consensus approach to decision making has helped to assure and maintain federal and provincial agency representation. By definition, agency representatives serving on a consensus-based group are shielded from being in the position of belonging to an organization that takes positions contrary to federal or provincial policy. The council would be unable to come to consensus on any such position.

Other Fraser Basin Council participants (the local government, First Nations, and regional and sectoral representatives) get access to good information, a chance to raise issues and concerns in a forum where federal and provincial representatives are listening, and opportunities for coalition building to enhance their political influence. In addition to being a body to which governmental agencies can hand off problems or issues for study and deliberation (as noted above), the Fraser Basin Council serves as a forum through which issues can "bubble up" from stakeholders to provincial and federal policy makers. Here too the consensus approach provides an incentive to participation, since it effectively places these stakeholder representatives on an equal plane with representatives from federal and provincial agencies that have the constitutional and statutory authority as well as the budgetary resources most local, aboriginal, and sectoral representatives lack. The Fraser Basin Council itself has no constitutional or statutory authority to execute decisions on resource management policy, but its structure and operation place the officials who have that authority at a table (literally and figuratively) with other stakeholders in the basin and this is an important element of their continued commitment to it.

Not to be overlooked are the solidarity benefits that accrue to the individuals who serve on the council. Thanks to the work of the Fraser Basin Council staff, council gatherings such as the one observed for this project incorporated plenty of opportunities for enjoyable interactions among what has proved to be a very sociable group. At least one of the motivations for individuals to sustain a voluntary commitment to several meetings over a number of years is that the meetings include some conviviality, and it appears that council members have built a number of genuine friendships through their interactions.

The Fraser Basin Council staff interviewed and observed for this project appear to have been drawn to council employment and stayed with it for years based on a couple of factors. One is internal commitment to sustainability principles that the council articulates and espouses—several staff appear to have been devoted to concepts of environmental, social, and/or economic sustainability before they joined the council staff, and thus their employment offers them an opportunity to put principles into practice. That motivation is reinforced by the belief that the Fraser Basin Council is an organization that is truly making a positive difference, in ways that go beyond the opportunities that might be available with a more traditional non-governmental organization. Staff appear to be enthused about being part of an organization they associate with real action in addition to research and advocacy.

Of course, staff (especially managerial staff) also want to secure adequate funding to maintain the personnel and space that keep the council operating at a high level. This leads them not only to work closely with council members, but sometimes to pursue projects that seem only tangentially related to basin management concerns. A recurring topic of discussion within the staff and among the council is whether a particular project that has been brought to the council's attention for possible involvement is too far afield from the council's principal concerns. Staff and council members freely acknowledged that there have been occasions when funding opportunities associated with involvement in one or another project have stretched the council's own broadly defined scope and agenda rather far.

8. Application of the Analytical Framework

The analytical framework used in this research project, mentioned in Section 2 above and outlined in the Appendix to this paper, highlights several institutional variables that are hypothesized to be associated with progress or difficulty in achieving integrated water resources management at the river basin scale through decentralized institutional arrangements. Applying that framework to the Fraser basin case yields the following observations.

8.1 Contextual factors and initial conditions

At least three factors about the Fraser basin setting contribute to its prospects for successful basin management. One is the level of economic development of the nation, and a second is the level of economic development of the basin. Canada generally, and the Fraser basin particularly, are prosperous enough that policy makers and stakeholders have some resources to devote to research, institution building, meetings, projects of

environmental improvement, and monitoring and assessment. A third is the initial distribution of resources among basin stakeholders; for good or ill as a matter of economic policy, it happens to be the case that the vast majority of land and water resources in the Fraser basin are held as a public trust by the province of British Columbia or the Government of Canada and are used by private individuals under lease arrangements. This situation has allowed institutional arrangements to develop in the basin under conditions where no one interest or sector of basin users enjoys across-the-board priority or privilege in its claims to resource use—in other words, urban uses are not all privileged over rural ones or vice versa, mining over agriculture or vice versa, etc.

One aspect of the initial conditions in the Fraser basin presents a challenge, namely, the presence of social and cultural distinctions among basin stakeholders. The claims and title of aboriginal peoples (First Nations) versus the established economic and political power of the non-aboriginal descendants of European settlers has been a difficult issue of long standing throughout Canada, and this is certainly true of the Fraser basin. First Nations and non-aboriginal residents have had difficulty working together, understanding one another, and forging institutional arrangements for joint problem solving. The First Nations issue is never far from the surface of any natural resource issue in the Fraser basin or elsewhere in Canada.

8.2 Characteristics of the decentralization process

In this as in some of the other cases in this research project, it has not always been clear that there has been a "decentralization process" strictly so called. The construction of basin-scale institutional arrangements in the Fraser basin appears to be as much or more a matter of integrating already decentralized organizations and jurisdictions rather than decentralizing previously centralized ones. Nevertheless, some of the considerations in this category are definitely relevant to the Fraser Basin case. One is the extent of central government recognition of local-level basin governance, which has been extraordinarily positive. Not only did the Canadian national and British Columbian provincial governments join in the predecessor organizations in the basin (the estuary steering committee, the basin management board) and fund the Fraser River Action Plan from 1992 through 1998, but they have been original and consistent members of the Fraser Basin Council and have supported it financially.

Another factor has been the consistency of that support through changes of government and administration at both the provincial and federal levels. Although Fraser Basin Council members and staff are always alert to the possibility that electoral changes of government might bring shifts in commitment, thus far the institutional arrangements for Fraser Basin management have maintained support from both levels through electoral changes. It remains to be seen how the council will cope with recent changes in the leadership structure. Losing strong and committed champions who possess well-developed managerial skills as well as political acumen can sometimes disrupt agency activities.

8.3 Characteristics of central-local relationships and capacities

In a similar vein, there are a number of favorable factors in this category. The financial resources and the financial autonomy of the Fraser Basin Council are quite strong, though they remain an important concern of the members and staff. The council members have, through the Fraser Basin Society and the council's own by-laws, the demonstrated ability to create and modify the institutional arrangements with which they work—vide the adoption of the Charter for Sustainability, and the transformation of the Fraser Basin Management Board into the Fraser Basin Society/Fraser Basin Council structure that exists today. As suggested above, however, the water rights system is something of a mixed bag—on the one hand, the arrangements governing rights to water and land use allow for considerable management flexibility, but on the other, the control of groundwater resources is particularly weak and represents a current and future vulnerability to the water resource management aspects of the overall basin sustainability effort.

8.4 Internal configuration of basin-level institutional arrangements

The strongest features here are: the availability of a basin-level governance body (the council), the recognition of sub-basin communities of interest through the composition of the council with regional representatives and through its employment of regional coordinators, and the institutionalization of regular monitoring of basin conditions by means that are trusted by resource users. The Fraser Basin Council also was designed quite deliberately to provide information sharing and communication among basin stakeholders, to provide means for basin stakeholders to enter into agreements to take actions for improvement of basin conditions, and to resolve conflicts. The one variable in this category that is not entirely favorable has to do with the clarity of institutional boundaries—while the Fraser Basin Council has emerged as the paramount deliberative body in the basin, in its capacity as a non-governmental organization funded through a non-profit society, the council generally cannot turn its decisions and plans into actions. It usually must hand off projects to other (usually governmental) entities for implementation, and at times even the council members are not entirely clear what actions are within the council's scope. Still, as discussed further below, the Fraser Basin Council's existence as a non-governmental organization also carries some advantages.

9. Performance Assessment

The Fraser Basin Council regularly assesses basin conditions, and has even invested in review of its own structure and operations. The council publishes annual reports, State of the Basin reports and snapshots on sustainability, and holds biennial conferences, all focused on basin conditions. Calbick et al. (2004: 82-106) devote a chapter to compiling and summarizing information from these sources in a review of the council's performance, which can be consulted for more details. Here are a few natural resource-related measures or indicators.

- Comparing the most recent decade with the historical record, the number of salmon returning to spawn has increased in half of the basin streams assessed.
- Toxic discharges in the basin as a whole have declined due to municipal sewage treatment plant upgrades and the adoption of new technologies at pulp and paper plants.
- Lower Fraser River bottom sediments have shown improving trends in lead concentrations.
- Measured concentrations of most pollutants in the main stem of the Fraser River have not exceeded water quality guidelines. The exceptions are iron and copper (which may be exceeded because of naturally high background levels in the basin) and the industrial wastewater indicator adsorbable organohalides (AOX) downstream of pulp and paper mills.
- Chloride and AOX have declined in the Fraser River since 1991, reflecting changes in the pulp bleaching process. Even though AOX amounts still exceed provincial guidelines from time to time, AOX is an indicator for a number of industrial contaminants, and direct measures of those contaminants have shown improvement and have persisted below provincial guidelines since 1995. Restrictions on fish consumption from the Fraser River upstream of Hope were lifted by the B.C. government in 1994, and on the Thompson River in 1995.
- Fecal coliform concentrations have declined on the main stem of the Fraser River in the upper area, due to improved sewage treatment and disposal at upper area cities such as Fort George and Quesnel.
- "Since FRAP's inception [1992], a much clearer picture of the extent, sources, and potential mitigation of Fraser River pollution has been formed. Water quality monitoring projects undertaken by DFO in partnership with EC have yielded important baseline information concerning contaminant levels in the Fraser River and its biota. DFO Science Sector projects concerning the impact of contaminants on salmon have been particularly successful in identifying sub-lethal effects of pollution…. Through FRAP, habitat-mapping and science studies were undertaken which would not have otherwise been carried out. The legacy of these studies is a greater understanding of how the river ecosystem functions, particularly with regard to factors that affect its salmon." (Calbick et al. 2004: 57).

These changes in basin conditions are monitored by the Fraser Basin Council; not all changes or improvements result from FBC programs or activities.

In 2002, the FBC employed a consulting firm in 2002 to interview council members, staff, and external observers to assess the council's own performance and effectiveness (SALASAN Associates 2002). The report reflected a mix of findings similar to the ones reached here: involvement in the FBC has been a satisfying experience for participants; the FBC's status as a nongovernmental body and its broad representation are extremely helpful to addressing issues that cross agency domains and jurisdictional boundaries and to promoting inclusion of a wide range of perspectives; on the other hand, FBC occasionally gets involved in issues that are not as clearly related to its charter and runs some risk of loss of focus.

10. Conclusions

Since one of the most distinctive features of this case is the role of the Fraser Basin Council as a non-governmental organization, some concluding comments are in order about how well that has worked in the Fraser Basin and its possible implications elsewhere. It can certainly be argued that the NGO model reduces some of the bureaucratic "turf battles" that one would expect to be associated with placing basin management responsibility in an existing agency, or creating an agency that would have authority and responsibilities that were transferred from or overlapped with existing agencies. The NGO approach also fits well with a federal system such as Canada's, since it provides a means of crossing jurisdictional boundaries among levels of government in a context where a constitution divides authority and one level of government is not entirely superior or subordinate to the other. It is also suited to a common-law cultural context where private organizations are free to do anything that isn't forbidden by law, and to take actions (including the raising and distribution of funds) up to the limits of public authority.

Furthermore, the NGO approach in the Fraser basin has allowed for the integration of First Nations and private stakeholders in ways that more traditional inter-governmental programs have often found difficult if not impossible. It has served as a good forum for information generation and sharing, since there is less concern over who "owns" the information. An NGO has the boundary flexibility to cover the whole basin (which no local government can do) but not more than the basin (as would be the case for a provincial or federal agency). As already noted in Section 7, an NGO of the Fraser Basin Council type also provides good political cover for agencies, who can justify actions that might otherwise be unpopular with some constituency.

The NGO approach epitomized by the Fraser Basin Council also has its weaknesses and drawbacks. Most important is the fact that the council is generally unable to implement the plans and programs it agrees upon, and must hand them off to others—usually governmental agencies—for actual performance. This limitation means that matters on which the council has made recommendations do not always get done or get done swiftly or without modification by the implementing agencies. A more vigorous advocacy role, prodding governments or other bodies for action, has its own risks, however, as one of the council's most important assets is its reputation for neutrality.

Other vulnerabilities include the fact that the Fraser Basin Council's consensus decision making approach, though helpful in a number of respects as noted in Section 7, is also time-consuming and can be frustrating. As an NGO financially reliant upon good-will contributions and funded projects, the Fraser Basin Council is subject to enough budgetary uncertainty (despite the consistency of governmental contributions to date) to limit its ability to commit to long-range projects. An NGO in such a position is also continually vulnerable to "mission creep," the temptation to follow the money that is available for projects that may be beyond its primary concerns and interests.

On balance, the approach represented by the Fraser Basin Council has worked well in this setting as a means of bridging fragmented public authorities and integrating indigenous and other private stakeholders. It has succeeded so far in preserving a reputation for objectivity and avoiding widespread perception of bias, and in building a more diverse financial base. The council's structure, agenda, and performance are key reasons the Fraser basin has proved to be a valuable addition to this research project.

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Appendix: Variables in the Analytical Framework

As noted in Section 2, the analytical framework used for this research project entails several variables hypothesized to be related to the success or failure of river basin management institutions, grouped into four categories.

Contextual factors and initial conditions

The literature on decentralized water resource management indicates that successful decentralization is at least partly a function of the initial conditions that prevail at the time a decentralization initiative is attempted. These initial conditions are elements of the social context of the decentralization effort. They include

- Economic development of the nation;
- Economic development of the basin area;
- Initial distribution of resources among basin stakeholders; and
- Class, religious, or other social/cultural distinctions among basin stakeholders.

Characteristics of the decentralization process

In countries that have attempted to decentralize water resource management to the basin level, characteristics of the decentralization process itself will affect the prospects for successful implementation. Two necessary conditions of a decentralization initiative are (a) devolution of authority and responsibility from the center, and (b) acceptance of that authority and responsibility by the local or regional units. Whether (a) and (b) occur will depend in part upon why and how the decentralization takes place. Important factors include

- Whether basin-level management was a local initiative to assume management responsibilities, a devolution that was mutually desired by local stakeholders and central government officials, or a decision by central government officials to shed water resource management responsibilities regardless of whether basin stakeholders wanted to assume them;
- The extent of central-government recognition of local-level basin governance; and,
- Whether central government officials maintained a policy commitment to decentralization and basin management through transitions in central government administration.\

Characteristics of central government/basin-level relationships and capacities

Because successful decentralization requires complementary actions at the central government and local levels, other aspects of the central-local relationship can be expected to condition that success. Political and institutional variables should be

explored that relate to the respective capacities of the central government and the basin-level stakeholders, and the relationship between them. Key factors include

- The extent to which devolution of water management responsibilities from central government to basin institutions has been real or merely rhetorical, and whether devolution has been handled as a supportive transition to basin management or as an abrupt abandonment of central government authority;
- The financial resources available to basin-level institutions, and the extent of their financial autonomy;
- Basin management participants' ability to create and modify institutional arrangements that are tailored to their needs and circumstances;
- The extent of other experience at the local or regional level within the country with self-governance and service provision;
- The distribution (particularly asymmetries) of national-level political influence among basin stakeholders;
- Characteristics of the water rights system in the country which facilitate or hinder basin management efforts; and
- Whether basin-level institutions have had adequate time for implementation and adaptation of basin management activities.

The internal configuration of basin-level institutional arrangements

Successful implementation of decentralized water resource management will also depend on features of the basin-level arrangements created by stakeholders and/or central government officials. Important ones include

- The presence of basin-level governance institutions;
- The extent of clarity of institutional boundaries, and their match with basin boundaries;
- Whether and to what extent basin-level institutional arrangements recognize sub-watershed communities of interest;
- The availability of forums for information sharing and communication among basin stakeholders;
- The ability to make, monitor, and enforce contingent contracts whereby basin stakeholders can agree to contribute to improvements in basin conditions;
- The institutionalization of regular monitoring of basin conditions by means that are trusted by water users; and
- The availability of forums for conflict resolution.

Certainly, these factors will not all apply with equal significance in all cases. In each case, the emergence and path of river basin management will be affected profoundly by some of these variables, affected slightly by others, and not at all by some. Institutional analysis in a case-study setting consists largely in determining which institutional factors in what combination appear to have been linked to outcomes. Furthermore, many of the variables listed above have subjective components, and will be assessed differently by different participants and observers. It is therefore essential in these case studies that team members interview individuals with a variety of perspectives.